

$$1) 121x^2 - 36 \quad \text{DOTS} \\ (11x-6)(11x+6) \quad \#8$$

$$2) 3x^3 - 12x^2 - 36x \\ \text{GCF } 3x(x^2 - 4x - 12) \quad \#20 \\ \text{AM } \boxed{3x(x-6)(x+2)}$$

$$3) 16x^3 + 128 \\ \text{GCF } 16(x^3 + 8) \\ \text{SOAP } 16(x+2)(x^2 - 2x + 4) \quad \#9 \\ 16(x+2)(x^2 - 2x + 4)$$

$$4) 160x^3 - 810x \\ \text{GCF } 10x(16x^2 - 81) \quad \#23 \\ \text{DOTS } \boxed{10x(4x+9)(4x-9)}$$

$$5) x^3 + 2x^2 + x \\ \text{GCF } x(x^2 + 2x + 1) \\ \text{AM } x(x+1)(x+1) \quad \#13 \\ x(x+1)^2$$

$$6) 24x^3 + 8x^2 + 24x + 8 \\ \text{GCF } 8(3x^3 + x^2 + 3x + 1) \\ \text{Grouping } 8(x^2(3x+1) + 1(3x+1)) \quad \#15 \\ 8(x^2+1)(3x+1)$$

$$7) 3x^3 + 2x^2 - 3x - 2 \\ \text{Group } x^2(3x+2) - 1(3x+2) \\ (3x+2)(x^2-1) \quad \#10 \\ \text{DOTS } (3x+2)(x-1)(x+1)$$

$$8) -x^3 - 8 \\ \text{GCF } -1(x^3 + 8) \quad \#7 \\ \text{SOAP } -1(x+2)(x^2 - 2x + 4) \\ (-x-2)(x^2 - 2x + 4)$$

$$9) x^2 + 18x + 81 \\ \text{AM } (x+9)(x+9) \quad \#6 \\ (x+9)^2$$

$$10) \quad 1 - x^3$$

$$\text{SOAP} \quad (1-x)(1^2 + 1x + x^2)$$

$$(1-x)(1+x+x^2)$$

1

$$11) \quad 9x^2 + 30x + 25$$

$$\text{AC} \quad 9x^2 + 15x + 15x + 25$$

$$3x(3x+5) + 5(3x+5)$$

$$(3x+5)(3x+5)$$

$$(3x+5)^2$$

$$\text{ac} = \frac{225}{15 \overline{) 15}}$$

12

$$12) \quad 6x^2 + x - 1$$

$$\text{AC} = \frac{-6}{3 \overline{) -2}}$$

$$\text{AC} \quad 6x^2 + 3x - 2x - 1$$

$$3x(2x+1) - 1(2x+1)$$

$$(3x-1)(2x+1)$$

17

13) $18x^3 + 24x^2 + 6x$

GCF $6x (3x^2 + 4x + 1)$

AC

$$\begin{array}{l} 3x^2 + 3x + 1x + 1 \\ \downarrow \quad \quad \quad \downarrow \\ 3x(x+1) \quad | \quad +1(x+1) \\ 6x(x+1)(3x+1) \end{array}$$

$$AC = \frac{3}{3} \overline{)1}$$

#3

14) $9 - 4x^2$

DOTS $(3+2x)(3-2x)$

#22

15) $9x^2 - 24x - 9$

GCF $3 (3x^2 - 8x - 3)$

AC

$$\begin{array}{l} 3x^2 - 9x + 1x - 3 \\ \downarrow \quad \quad \quad \downarrow \\ 3x(x-3) \quad | \quad +1(x-3) \\ 3(x-3)(3x+1) \end{array}$$

$$AC = \frac{-9}{-9} \overline{)1}$$

#5

16) $4x^2 - 29x + 30$

AC $4x^2 - 24x - 5x + 30$

$$4x(x-6) - 5(x-6)$$

$$(x-6)(4x-5)$$

$$AC = \frac{120}{-24} \overline{)-5}$$

#21

17) $(x+2)^2 - (y-3)^2$

DOTS $(x+2+y-3)(x+2-(y-3))$

$$(x+y-1)(x-y+5)$$

$$\begin{array}{l} a^2 - b^2 \\ (a+b)(a-b) \end{array}$$

#2

18) $8x^3 - 125$
 SOAP $(2x - 5)(2x^2 + (2x)(5) + 5^2)$
 $\sqrt[3]{8x^3} = 2x$
 $\sqrt[3]{125} = 5$ $(2x - 5)(4x^2 + 10x + 25)$ #4

19) $49x^2 - 64y^2$
 DOTS $(7x + 8y)(7x - 8y)$ #18

20) $ax + ay + by + bx$
 Group $a(x+y) + b(y+x)$ #19
 $(x+y)(a+b)$

21) $x^4 - 16$
 DOTS $(x^2 - 4)(x^2 + 4)$ #16
 DOTS $(x+2)(x-2)(x^2 + 4)$

22) $-3x - 18 + x^2$
 $x^2 - 3x - 18$ #14
 AM $(x-6)(x+3)$

23) $2x^3 - 16x^2 + 32x$
 GCF $2x(x^2 - 8x + 16)$
 AM $2x(x-4)(x-4)$ #11
 $2x(x-4)^2$

24) $x^6 - y^2$
 DOTS $(x^3 + y)(x^3 - y)$ #24